FHQ841-T LCD Panels

User Manual

020-000735-01

CHRISTIE®

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User Manual

020-000735-01

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Introduction

This manual describes how to install, set up and operate the FHQ841-T LCD Panels. Throughout this manual, the FHQ841-T LCD Panels are referred to collectively as the “display.”

Target Audience

The manual helps end users get the most out of the display, and every effort has been made to ensure that this manual is accurate as of the date it was printed. However, because of ongoing product improvements and customer feedback, it may require updating from time to time.

Textual and Graphic Conventions

The following conventions are used in this manual, in order to clarify the information and instructions provided:

- Remote and built-in keypad button identifiers are set in upper-case bold type; for example, “Press MENU to return to the previous menu.”

In addition to these conventions, underlining, boldface and/or italics are occasionally used to highlight important information.

A carriage return must be used after each command or string.

Description, Features and Benefits

The FHQ841-T LCD Panel represents the cutting edge of direct-view LCD technology.

They combine ultra-high resolution and unparalleled image quality with configurable I/O in a large-format display for a wide range of digital signage and control-room applications.

Key Features and Benefits

The display offers these key features and benefits:

- Full-HD Native Resolution: 3840 x 2160 (16:9 Native Aspect Ratio)
- High Brightness: Up to 260 nits
- Ultra-wide 178-degree Viewing Angle
- Display Port 1.1a, HDMI1.4b and DVI-D Inputs with High-bandwidth Digital Content Protection (HDCP)
- Direct LED Backlight with active ambient light sensor to adjust backlight automatically
- Touch Capability:

- Precise, highly responsive touch technology
- High touch sensitivity–no pressure required
- Any touch: finger, gloved hand or pointer
- Windows 7 and 8 compliant
- USB: one cable for power and communications

Parts List

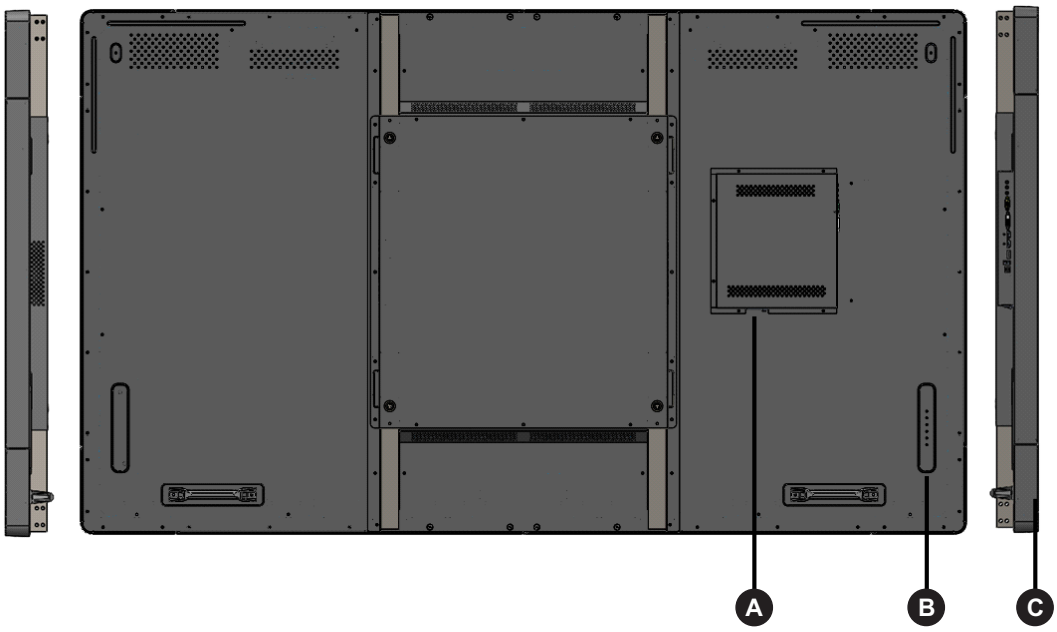
Your display is shipped with the following items.

- FHQ841-T LCD Panel
- Remote Control Unit and battery
- VGA Cable (Length 1800mm)
- DVI-D Cable (Length 1800mm)
- RS232 Cable (Length 1800mm)
- USB Cable (Length 3000mm)

Controls and Functions

Display at a Glance

The illustration below shows the key display components, and the paragraphs that follow describe them.

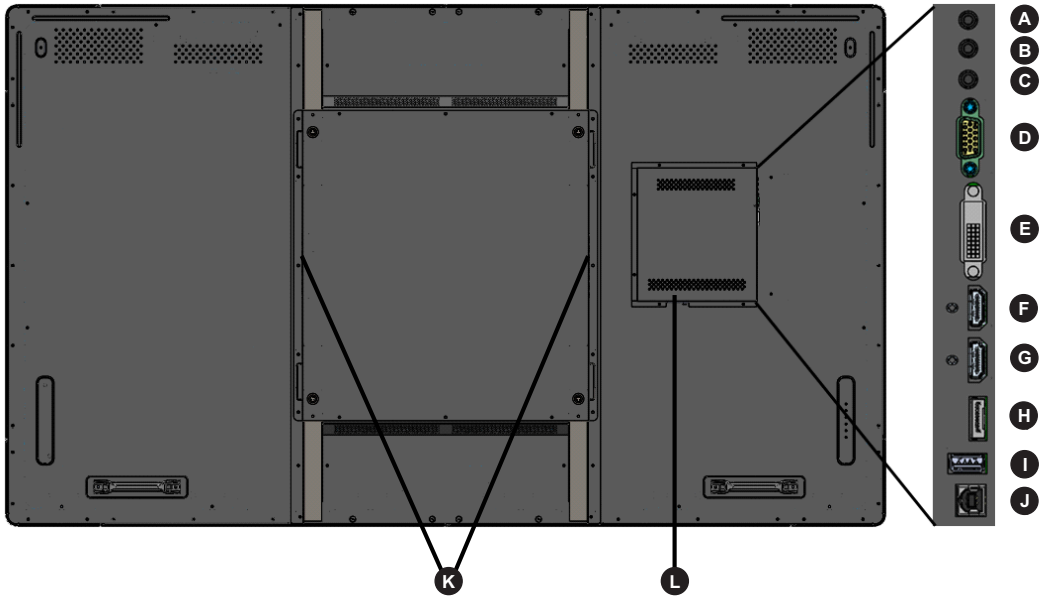


A	**MAIN POWER SWITCH** Connects or disconnects the display panel from the AC power source.
B	**IR Receiver / POWER STATUS LED** Lights orange to indicate that the display is: Green—On Red—Standby (ECO/Normal Mode) Red—Power Save (ECO Mode) Amber—Power Save (Normal Mode)

C	**KEYPAD** You can use the keypad instead of the remote control unit to operate the on-screen display (OSD) controls. The keypad operates as follows: **On/Standby (** **)** Press once to toggle from standby mode to on mode. Press it again to return to standby mode. **? (SOURCE)** To select a source, press the **?(SOURCE)** button repeatedly (with no menus visible on-screen). When a menu is visible on-screen, this button operates identically to the up-arrow. **?** When a menu is visible on-screen, this button operates identically to the down-arrow button on the display remote control unit. **+** Press this button to increase the volume. When a menu is visible on-screen, this button operates identically to the right-arrow (or **SEL**) button on the display remote control unit. **-** Press this button to decrease the volume. When a menu is visible on-screen, this button operates identically to the left-arrow button on the display remote control unit. **M (MENU)** Press this button to display the on-screen display (OSD), or to exit the on-screen display (OSD) and return to the previous one.

Input Panel

The illustration below shows the display input panel.



A	**RS232C In (3.5Ø Stereo)** Connector for interfacing with a PC or control system.
B	**Audio Out (3.5Ø Stereo)** For connecting external, powered speakers or an external audio receiver/amplifier.
C	**Audio In (For VGA and DVI-D inputs)(3.5Ø Stereo)** Connect the audio output from a personal computer here.
D	**VGA In (15-pin D-Sub)** For connecting components that have RGB or component output jacks such as a personal computer or external DTV decoder (a break-out cable is needed for BNC-type connection).
E	**DVI-D In (HDCP-compliant)** VESA-standard digital video input from a personal computer, or digital video from a DVD player or HD set-top box.
F	**HDMI 1 In** HDCP-compliant digital video input for connecting HDMI 1.4b or DVI sources.
G	**HDMI 2 In** HDCP-compliant digital video input for connecting HDMI 1.4b or DVI sources.
H	**DP In** DisplayPort 1.1a and DisplayPort-HDCP 1.1 compliant, SD/HD input for connecting SDTV, EDTV or HDTV component video sources.
I	**Service In (USB A type)** Using a USB card to update the software for the product.
J	**Touch In (USB B type)** A standard, Type B USB port for connecting the Multi-Touch Controller host computer to the display.

K	**Power Input (100 to 240 VAC, 50/60Hz)** Connect the display to power here.
L	**Internal Speaker**

Remote Control Unit

The illustration below shows the display remote control, and the table that follows describes its functionality.

⏻	Turns on or off the product.
SOURCE	Select a connected source device.
▲	Move to the up menu.
▼	Move to the down menu.
SEL	Confirm a menu selection.
◄	Decreases the sound volume, or Move to the left menu.
►	Increases the sound volume, or Move to the right menu.
MENU	Opens the product on-screen menu system. When the menu system is already open, pressing this button will select the previous submenu.
INFO	Provides source and resolution information.
MUTE	Turns off the sound.
AUTO	Auto adjustment of VGA source.

Installation

NOTICE Installation must be performed by a qualified custom video installation specialist.

Remote Control

To install batteries in the remote control:

1. Press down the tab on the cover and pull the cover up.
2. Insert the included batteries (CR2025 3V).
3. Insert the lower tab of the cover into the opening, and press down the cover until it clicks in place.

Notes on Batteries

- Make sure that the battery polarities are correct when installing the batteries.
- If the remote control will not be used for an extended period, to avoid damage from leakage remove the batteries.
- Do not expose batteries to excessive heat.

Notes on Remote Control Operation

- Make sure that there is nothing obstructing the infrared beam between the remote control and the IR receiver on the display.
- If the effective range of the remote control decreases, or it stops working, replace the batteries with new ones.
- The remote control may fail to operate if the infrared remote sensor is exposed to bright sunlight or fluorescent lighting.
- Ambient conditions may possibly impede the operation of the remote control.
  If this happens, point the remote control at the display, and repeat the operation.

Quick Setup

Here is a quick overview of the display installation process. The sections following this one provide detailed instructions.

Step	Procedure	For Details...
1	Mount the display(s) on a wall (optional)	See *Mounting the Display* on page 19.

Step	Procedure	For Details...
2	Connect other external equipment to the display (optional): • Automation/control system (RS232)	See *Connections to the Display* on page 19.
3	Connect signal sources to the display	See *Connecting Source Components to the Display* on page 21.
4	Apply power to the display	See *Turning on the Power* on page 23.
5	Change the OSD language	See *Changing the OSD Language* on page 24.
6	Perform touch screen-specific installation and configuration tasks • Connect touch screen controller host computer to the display	See *Touch Requirements* on page 25.
7	Display calibration: adjust the following for each input: • Brightness • Contrast • Black level • Color and Sharpness • Color temperature and white balance	See *Picture Settings* on page 28.

Installation Considerations

Proper installation of the display ensures a satisfying viewing experience. Whether you are installing a display temporarily or permanently, you should take the following into account to ensure your display performs optimally.

Ambient Light

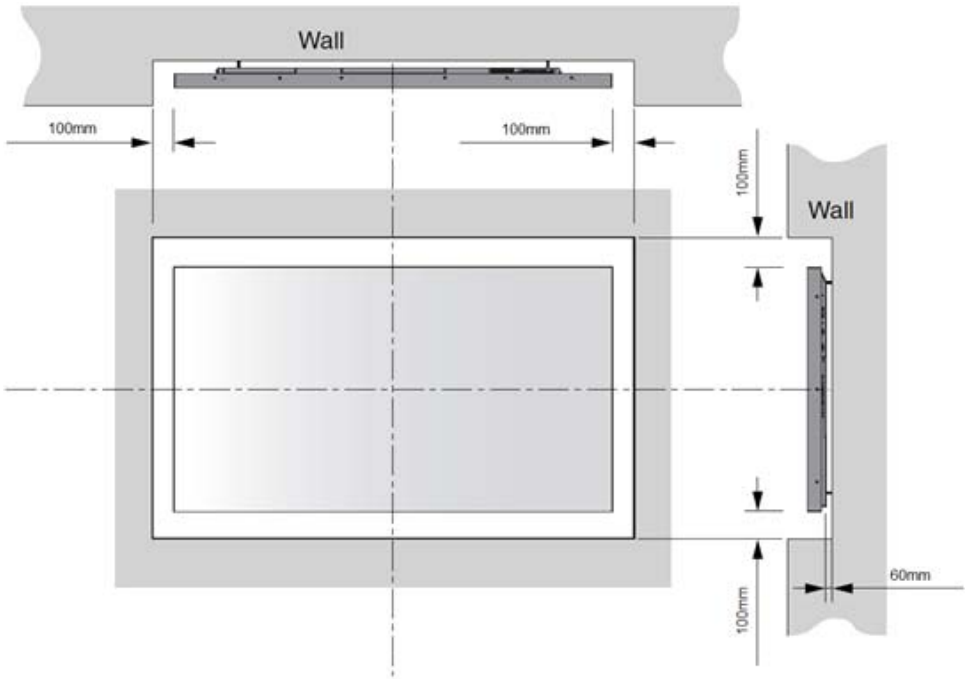
In general, minimize or eliminate light sources directed at the screen. Contrast ratio in your images will be noticeably reduced if light directly strikes the screen, such as when a shaft of light from a window or floodlight falls on the image. Images may then appear washed out and less vibrant.

Ambient Heat

Keep the ambient temperature constant and below 35°C (95°F) and 85% humidity. Keep the display away from heating or air conditioning vents.

Ventilation Considerations

If you are mounting the display in an enclosure, leave sufficient space on all sides between it and surrounding objects, as shown below. This allows heat to disperse, maintaining the proper operating temperature.



Mounting the Display

You can mount the display on a wall. If you do decide to wall-mount the display, ensure that the wall-mount bracket is installed according to the instructions included with it. The wall must be capable of supporting a redundant weight factor three times the weight of the display, or be reinforced. We recommend that this be done by a custom installation specialist.

NOTICE Use only the approved wall-mount kit designed for your display.

Connections to the Display

Proceed as follows to connect the display to your video sources, external controller(s) if present, and AC power.

When connecting your equipment:

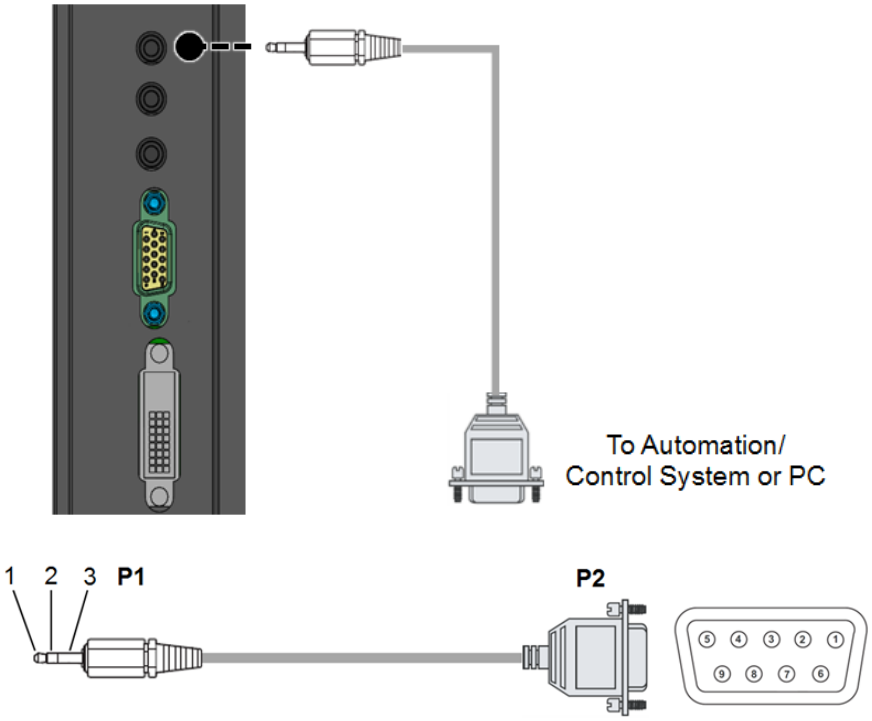
- Turn off all equipment before making any connections.
- Use the correct signal cables for each source.

- For best performance and to minimize cable clutter, use high-quality cables that are only as long as necessary to connect two devices. (Do not use a 20-foot cable when a 6-foot cable will suffice.)
- Ensure that the cables are securely connected. Tighten the thumbscrews on connectors that have them.

Connecting a Control System or PC

RS232 Connection

Use a straight-through RS232 cable with a 3.5Ø stereo connector to connect a PC or control/ automation system (if present) to the RS232 port on the display. For more information about using this connection, refer to *External control* on page 39.

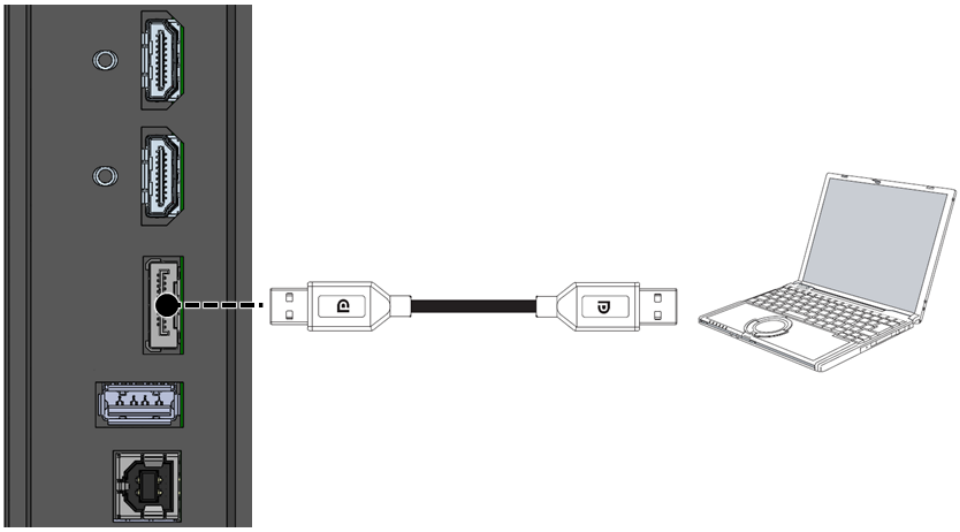


P1				P2		
Stereo 3.5 Ø	Tx	1	←	2	Rx	DSUB9P (Female)
	Rx	2	→	3	Tx	
	Gnd	3	—	5	Gnd	

Connecting Source Components to the Display

Connect your video sources to the display as shown and described in the sections that follow.

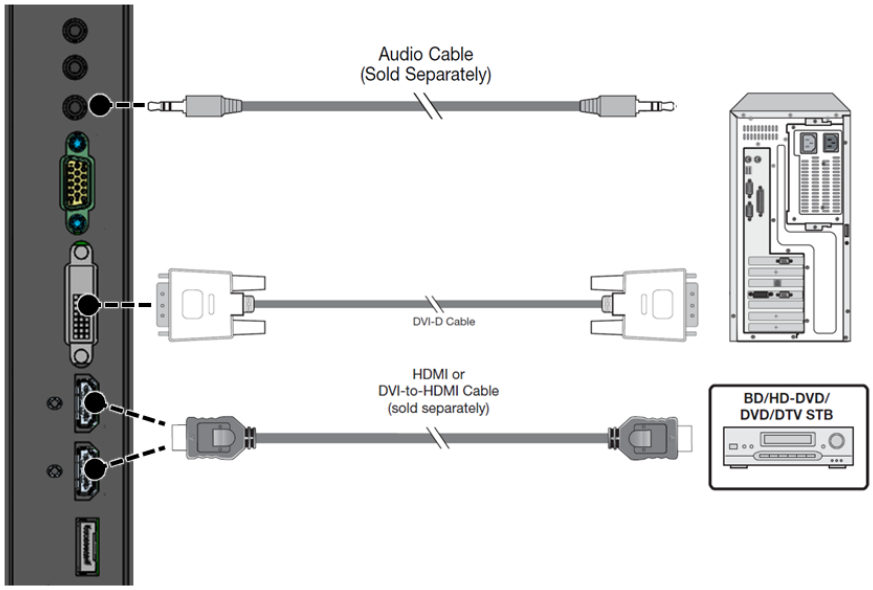
DisplayPort Source Connection



HDMI and DVI-D Source Connections

Use the HDMI inputs whenever possible. This ensures the highest video quality because the signal is carried in the digital domain throughout the entire signal path, from source component output into the display.

You can also connect computers with DVI output to these inputs. Refer to *Supported Timings* on page 44 for a list of compatible input signals. This display supports the VESA Display Data Channel (DDC) standard. This standard provides “Plug and Play” capability; the display and a VESA DDC-compatible computer communicate their setting requirements, allowing for quick and easy setup. For Plug and Play to work correctly, you must turn on the display before you turn on the connected computer.

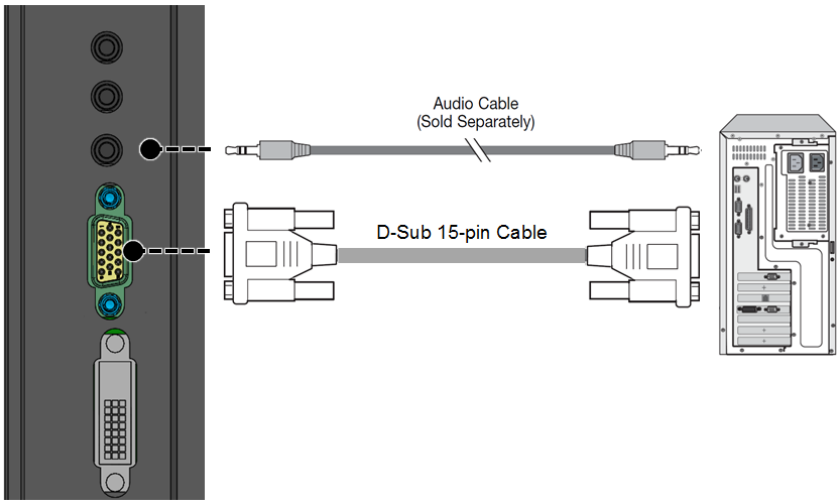


NOTICE

Use a high speed HDMI cable.

RGBHV (VGA) Source Connection

Connect a personal computer or other RGB source to the VGA input as shown below. For a list of compatible input signals see *Supported Timings* on page 44.



Turning on the Power

1. Turn on your source components.
2. Plug the female end of the supplied power cord into the AC receptacle on the side of the display (AC 100V ~ 240V).
3. Connect the other end to your AC power source.
4. Turn on the main power switch at the side of the display.

   The power indicator light indicates that the display is in “standby” mode.
5. Press the power button on the remote control to turn on the display (or press the power button on the keypad). After a brief warm-up period, the display will display an image.

Avoiding Image Retention

Follow the recommendations below to prolong the life of the display.

- Operate the Display Within Its Rated Ambient Environment
- Operating temperature: 5°C to 35°C (41°F to 95°F)
- Relative humidity: 85%, maximum.

⚠CAUTION Do not display static (non-moving) content on the display for long periods of time. This may cause image “burn-in” or image retention, which is not covered under warranty.

Avoid Static Content

- Display dynamic (moving) images whenever possible
- Consider using a screen saver to avoid displaying static (fixed) video content continuously.
- Turn off the display when not in use, or use the Real Time Clock feature (refer to *Screen (VGA source)* on page 31) to automatically turn off the display at preset times of the day.

Changing the OSD Language

The display OSD language is initially set to English, but can also display the menus in Simplified French, German, Italian, Russian, Spanish, Danish, Dutch, Norwegian, Finnish, Swedish or Korean. To change the OSD language:

1. Press **MENU**.
2. Select **OSD Settings** from the Main Menu.
3. Select **OSD Language**.
4. Press or to select the desired language and press **SEL**.

   The change takes effect immediately.

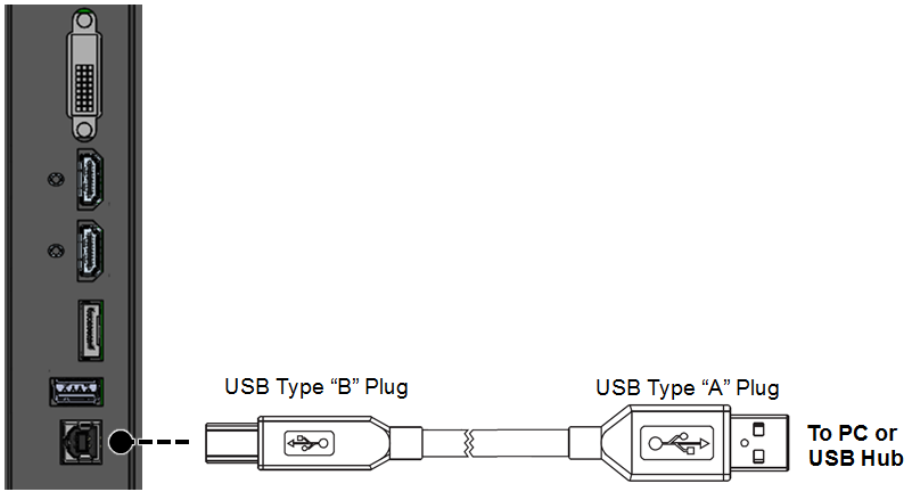
Enabling the Touch Screen

Before setting up your FHQ841-T display to support touch screen capability, ensure that:

- The touch screen controller host computer is turned **off**.
- The display is turned on.
- The video output from the computer is connected to a video input on the display.

Connecting the Touch Screen Controller Host Computer to the Display

Use the provided USB cable to connect the touch screen controller host computer to the USB input as shown below.



After (and only after) making this connection, turn on your host computer.

Touch Requirements

Hardware Requirements

- Computer Configuration (Minimum):
  - 2.2 GHz dual-core processor
  - 1 GB RAM
  - 10 GB available hard disk space
  - 128 MB Nvidia Geforce 6600T graphics card
- • Computer Configuration (Recommended):
  - 2.5 GHz quad-core processor
  - 3 GB RAM
  - 10 GB available hard disk space
  - 1 GB Nvidia GTX330 graphics card

Requirements (Multi-Touch Operation)

These operating systems natively support multi-touch operation:

- Microsoft Windows 7 Home Ultimate, Premium, Enterprise, Professional or Home premium
- Microsoft Windows 8

Requirements (Single-Touch Operation)

These operating systems natively support single-touch operation only:

- Microsoft Windows 7 Home Basic or Starter
- Microsoft Windows Vista Enterprise or Vista Business Edition
- Windows XP or Windows Server 2003 with .NET Framework version 2.0 or later

Operation

Using the On-Screen Menus

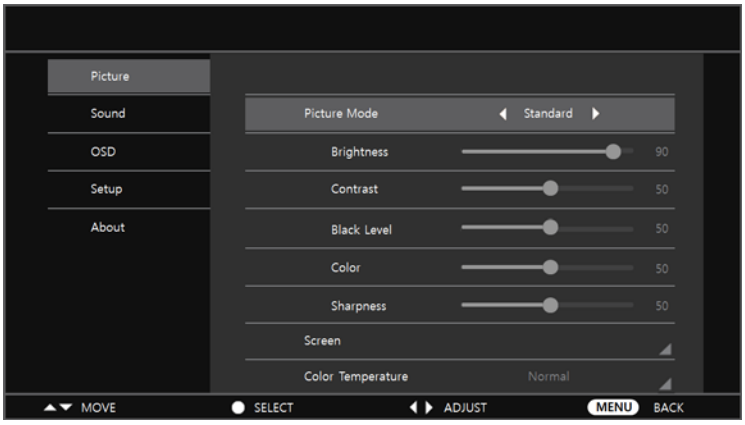
The OSD menus are arranged hierarchically, as shown here and on the next page. Depending on the selected input source and signal characteristics, some menu options may not be available.

- To display the on-screen menus, press **MENU** on the remote control or built-in keypad.
- To select a sub-menu, use the ▲ and ▼ buttons to highlight it. Then, press SEL to enter that sub-menu.
- To select a menu item, use the ▲ and ▼ and buttons to highlight it. Then, press ◄ or ► to adjust that setting, and then the menu by pressing the menu button and exit.

PICTURE	Picture Mode	Standard/Dynamic/User		
		Brightness	0-100	
		Contrast	0-100	
		Black Level	0-100	
		Color	0-100	
		Sharpness	0-100	
	Screen	Auto Adjust		For VGA source
		H-Position	0-100	
		V-Position	0-100	
		Clock	0-100	
		Phase	0-100	
	Color Temp	Normal/Warm/Cool/User		
		Red	0-100	
		Green	0-100	
		Blue	0-100	
	Movie Mode		Off / Low / Middle / High	(Default: Off)
	Picture Reset			Reset the settings related

SOUND	Sound Mode	Treble	0-100	
		Bass	0-100	
	EQ	120Hz	0-100	
		500Hz	0-100	
		1.2KHz	0-100	
		7.5KHz	0-100	
		12KHz	0-100	
	Balance		L50-R50	
	Sound Reset			Reset the settings related
OSD	Language		English / Spanish / French / Danish / Russian / German / Italian / Dutch / Norwegian / Finnish / Swedish / Korean	(Default: English)
	OSD Turn Off		Off/5/10/15sec	
	OSD Reset			Reset the settings related
SETUP	Power Save		Off/On	(Default: On)
	Standby Mode		ECO/Normal	(Default: ECO)
	Setup Reset			Reset the settings related
	Factory Reset			Reset the all MENU
ABOUT	Model Number			
	Input			
	Version			

Picture Settings



Use the controls in the Picture Settings menu to calibrate each display input to achieve optimum picture quality.

Connect your test pattern source to the input that you are calibrating and proceed as follows, and perform the adjustments in the order listed here.

Picture Mode

Select Picture Mode from the Picture Settings menu, then press ▲ or ▼ to select one of two image quality presets (Standard or Dynamic) depending on the type of program material you are viewing. These presets automatically adjust the other image settings for optimal image quality. Or, select User to adjust Brightness, Contrast and other settings manually.

Brightness

The Backlight control changes the apparent brightness of the displayed image. Its effect is similar to that of a lamp intensity control on a projector.

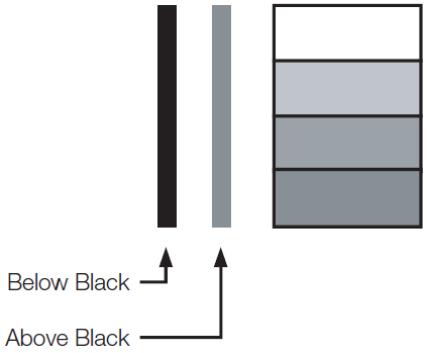
Contrast

On your external test pattern source, select a stepped, gray-bar pattern like the one shown below.

Select Contrast and press ◄ or ► to adjust the contrast to a point just below which the white rectangle starts to increase in size.

Black Level

On your external test pattern source, select a PLUGE pattern. (PLUGE is an acronym for “Picture Line- Up Generation Equipment.”)



PLUGE patterns vary but generally consist of some combination of black, white and gray areas against a black background. The example above includes two vertical bars and four shaded boxes.

Select Black Level from the Picture Settings menu and press ◄ or ► to adjust the brightness so that:

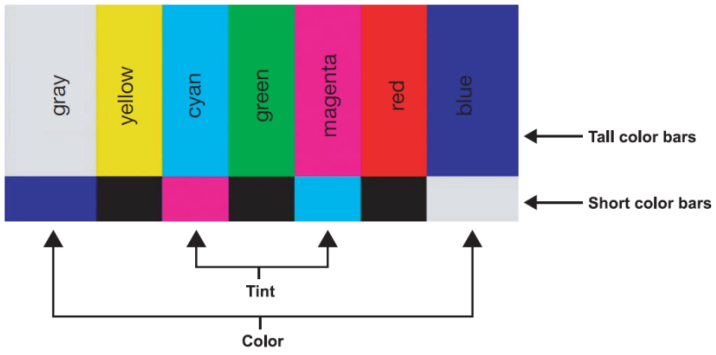
- The darkest black bars disappear into the background.
- The dark gray areas are barely visible.
- The lighter gray areas are clearly visible.
- The white areas are a comfortable level of true white.
- The image contains only black, gray and white (no color).

Contrast and Black Level controls are interactive. A change to one may require a subtle change to the other in order to achieve the optimum setting.

Color

"Color" ("Hue" or "tint") is essentially the ratio of red to green in the color portion of the image. When Color is decreased, the image appears redder; when it is increased the image appears greener. To adjust the color, use a blue filter when viewing the color bar pattern, as you would for adjusting color saturation.

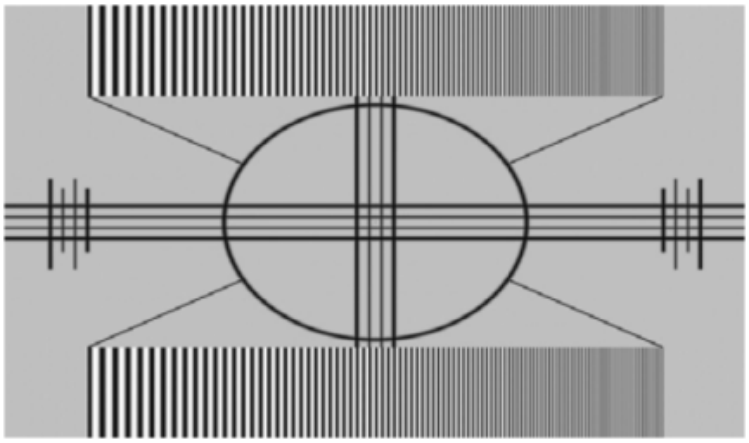
Select Color from the Picture Settings menu and press ◄ or ► to adjust it until the cyan and magenta color bars (on either side of the green bar) appear to be a single shade of blue.



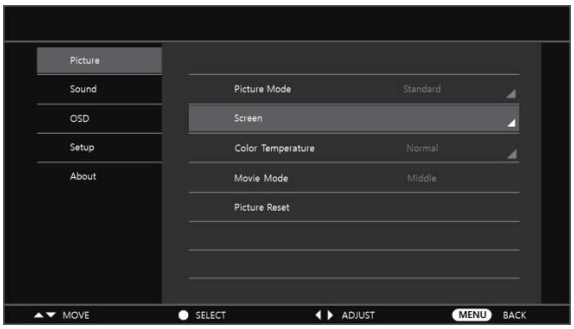
Like the brightness and contrast controls, the color and tint controls are interactive. A change to one may require a subtle change to the other in order to achieve the optimum setting.

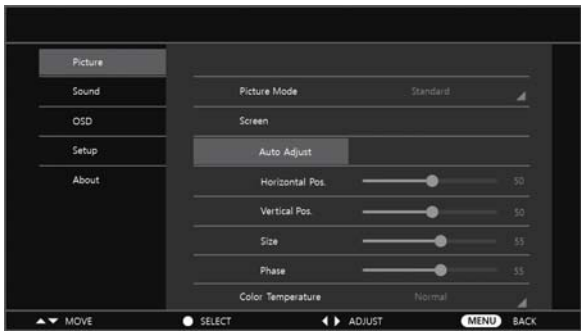
Sharpness

"Sharpness" is the amount of high-frequency detail in the image. To adjust sharpness, select Sharpness from the Picture Settings menu. On your external test pattern source, select a pattern like the one shown below. Adjust as needed, looking for white edges around the transitions from black to gray and differently-sized lines in the "sweep" patterns at the top and bottom. Lower the sharpness setting to eliminate them.



Screen (VGA source)





Auto Adjustment (VGA source)

Select Auto Adjust from the Picture Settings menu to force the display to reacquire and lock to the input signal. This is useful when the signal quality is marginal.

Image Position (VGA source)

This control sets to fine-tune the image position.

- **Horizontal Pos.:** Press ▶ to shift the image to the right; press ◀ to shift it to the left.
- **Vertical Pos.:** Press ▶ to shift the image upward; press ◀ to shift it downward.

Size (VGA source)

This control sets the frequency of the pixel sampling clock, indicated by the number of incoming pixels per line, so that all pixels generated by a particular source are sampled. Steady flickering or several soft vertical stripes or bands across the entire image indicates poor pixel tracking. Proper pixel tracking helps ensure that the image quality is consistent across the screen, that aspect ratio is maintained and that pixel phase (see below) can be optimized.

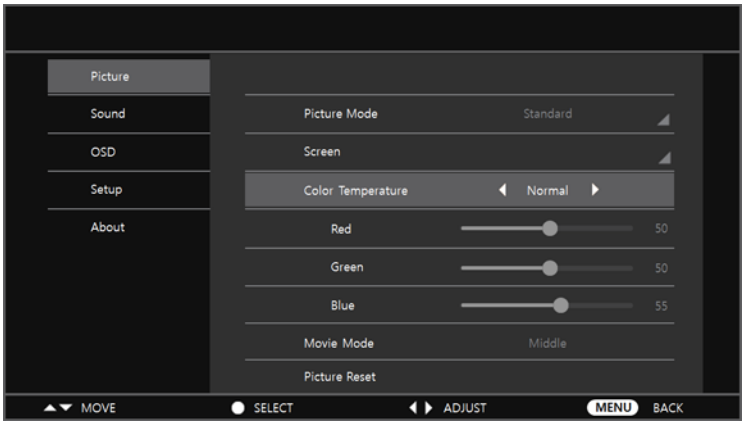
Phase (VGA source)

This control adjusts the phase of the pixel sampling clock relative to the incoming signal. Adjust the phase when an image still shows shimmer or “noise” after the Clock setting has been optimized.

Adjust the Phase after adjusting Size (see above).

For best results, use a good test pattern such as a smooth gray consisting of a clear pattern of black and white pixels, or a similar “half on, half off” graphic image. Adjust the slide bar until the image stabilizes and each pixel is clearly defined. You may notice that you can stabilize the image at more than one point. Use either setting in such cases.

Color Temperature



Select Color Temperature from the Picture Settings menu to adjust the color temperature.

Red/Green/Blue Gain

Use the Gain controls to correct color imbalances in the bright areas of the image. A good way to do this is to use a test pattern consisting mostly of solid white areas, such as an 80 IRE “window” pattern. If the white areas contain traces of red, green or blue, decrease the Gain for that color.

Movie Mode

Adjusts the amount of blurring and juddering of the moving image.

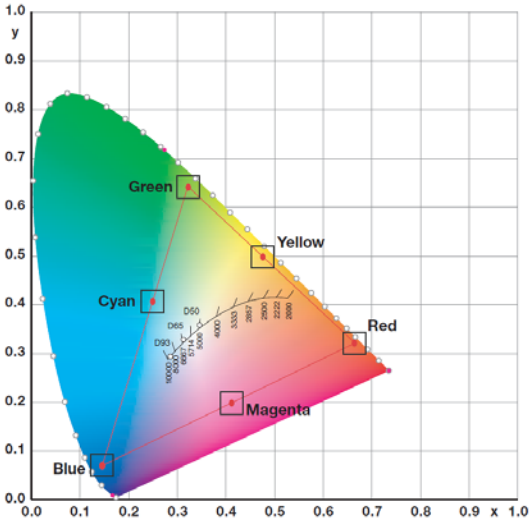
- **Off:** When connecting to a game console, you can enjoy a more realistic gaming experience by Selecting Off.
  The response time of Touch is faster than when Movie mode is active.
- **Low / Middle / High:** When you watch movies, you can enjoy a smoother image.

Picture Reset

Returns the current the Picture settings to the default settings.

What are "color points?"

A "color point" is an x/y coordinate pair that defines a color's location on the standard CIE chromaticity graph, shown below. (CIE stands for "Commission Internationale de l'Éclairage" (International Commission on Illumination), the organization responsible for color measurement and management standards.)



Sound Settings

Sound Mode

- **Treble:** Select Treble from the Audio Settings menu and press ◄ or ► to cut or boost the high audio frequencies.
- **Bass:** Select Bass from the Audio Settings menu and press ◄ or ► to cut or boost the low audio frequencies.

EQ

Select the audio frequency from EQ of the Sound Settings menu and press ◄ or ► to adjust the audio frequencies.

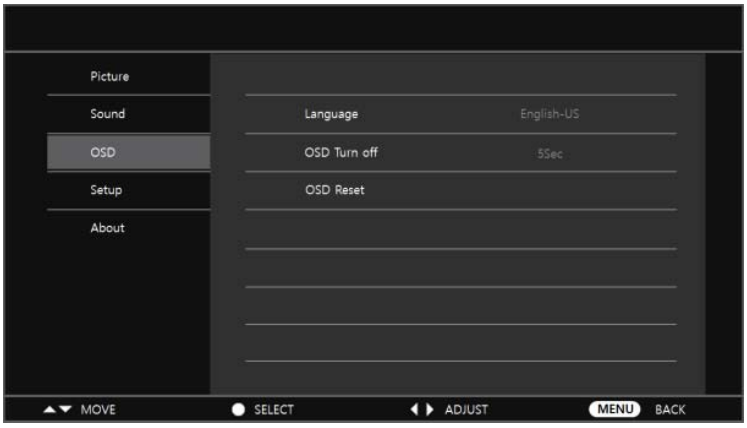
Balance

To adjust the left/right speaker balance, select Balance from the Sound Settings menu and press ◄ or ► to make one channel louder than the other.

Sound Reset

Returns the current the Sound settings to the default settings.

OSD Settings



Language

Select OSD Language from the OSD Settings menu and press ◄ or ► to select the OSD Language (English, French, German, Italian, Russian, Spanish, Danish, Dutch, Norwegian, Finnish, Swedish, and Korean).

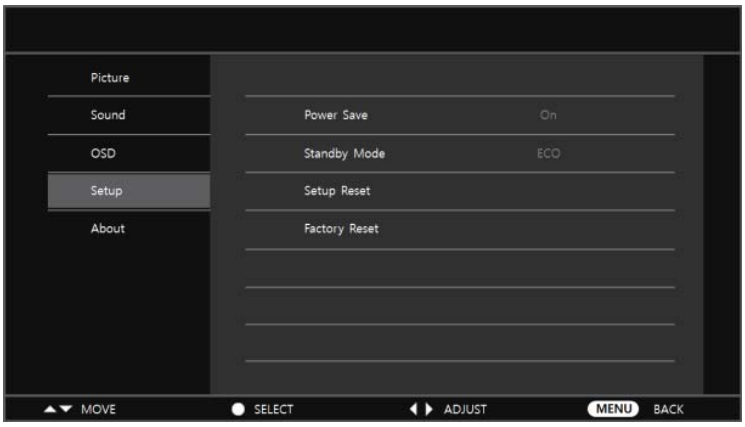
OSD Turn off

Select OSD Timeout from the Basic Settings menu to specify how long the menus remain on-screen after selecting them (5s / 10s / 15s / Off).

OSD Reset

Returns the current the OSD settings to the default settings

Setup Settings



Power Save

The display enters power-saving mode.

Standby Mode

Select Standby Mode from the Setup Settings menu and press ◄ or ► to control this feature, which operates as follows:

- **ECO:** ECO is selected, the power consumption is less than 0.5W. The display cannot wake up from power-saving mode when it receives an active video signal inputs, or receives a valid RS232 command.
- **Normal:** The display wakes up when it receives an active signal from its VGA, HDMI, Display Port or DVI inputs, or receives a valid RS232 command.

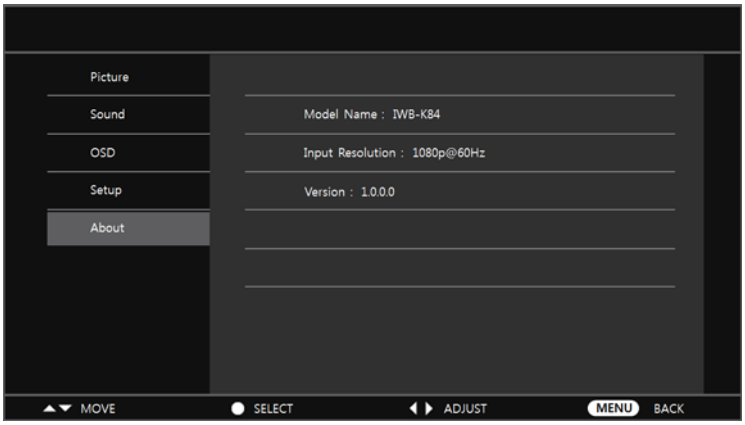
Setup Reset

Returns the current the Setup settings to the default settings.

Factory Reset

To reset ALL display settings (including image settings) back to their factory defaults, choose Factory Reset from the Setup Settings menu.

About



The read-only System menu provides the following status information about the display:

- The resolution and refresh rate of the active source.
- The currently-installed firmware version.

Maintenance and troubleshooting

Maintenance

The LCD Panel does not require any routine maintenance. There are no user-serviceable or user-replaceable parts. Unless you are a qualified, factory-trained technician, do not attempt to repair or replace any system component yourself. You will void the product warranty if you do so.

Troubleshooting

The table below provides some general guidelines for troubleshooting problems you may encounter with your display. If the suggested solutions fail to resolve the problem or if you encounter an issue not described here, please contact your dealer.

Symptom	Possible Cause	Solution
The display does not turn on.	• The display is not plugged in or the AC outlet is not active. • The main power switch is off. • The remote control batteries have run out.	• Ensure that the display is plugged in and that the AC outlet is active. • Set the main power switch (see *Display at a Glance* on page 13) to the on position. • Replace the batteries.
The display is on and menus appear, but there is no picture.	• Incorrect source selection. • Source component is not turned on. • Source component is connected incorrectly or not at all.	• Select the correct source. • Turn on the source component. • Check connections from the source component to the display.
The remote control does not work.	• The remote control batteries have run out.	• Replace the batteries.
The display is jittery or unstable.	• Poor-quality or improperly connected source. • The horizontal or vertical scan frequency of the input signal may be out of range for the display.	• Ensure that the source is properly connected and of adequate quality for detection. • Correct at the source.
Image is too bright and/or lacks definition in the bright areas of the image.	• Contrast is set too high.	• Decrease the contrast setting.
Image appears “washed out” and/or dark areas appear too bright.	• Black level is set too high.	• Decrease the black level setting.
Image is too dark.	• Black level and/or brightness are set too low.	• Increase the black level and/or brightness settings.

Symptom	Possible Cause	Solution
Images from an HDMI source do not display.	• The resolution and frequency of the video card in the computer are not compatible with the display. • HDMI cable from source to display is either defective or too long.	• Select a compatible resolution and vertical frequency (refer to *Supported Timings* on page 44). • Try a known-good and/or shorter HDMI cable.
Computer images do not display correctly.	• The resolution and frequency of the video card in the computer are not compatible with the display. • Clock and Phase settings need adjustment.	• Select a compatible resolution and vertical frequency (refer to *Supported Timings* on page 44). • Adjust Clock and Phase settings (refer to *Size (VGA source)* on page 31 and *Phase (VGA source)* on page 32).
Touch screen doesn't work	• Multi-touch controller host computer is not connected correctly.	• See *Connecting the Touch Screen Controller Host Computer to the Display* on page 25.

External control

In addition to using the display keypad or remote control unit, you can control the display using a serial (RS232) link or Ethernet connection to send commands and receive responses to those commands.

Serial Communications

The display uses a simple text-based control protocol to take requests from control devices and to provide responses to such devices. This section describes how to send control messages over a serial link between the display and an automation/control system or a PC running a terminal emulation program.

RS232 Connection and Port Configuration

Connect your control system or PC to the RS232 input of the display; refer to *Connecting a Control System or PC* on page 20. Configure the RS232 controller or PC serial port as follows: no parity, 8 data bits, 1 stop bit and no flow control. Set the baud rate to 19200bps, to match that of the display RS232 port.

Command and Response Format

Commands sent from an automation/control system or PC to the display must have the following format:

Direct Command Format (from computer)

- Format : [HEAD][SET ID][COMMAND][END]
- Example (Power on) : [K:][ALL][PON][.]
    - [HEAD] indicates the start of the command data (always K:).
    - [SET ID] is the display ID (always ALL).
    - [COMMAND] is the command data (3Bytes).
    - [END] indicates the end of the command data (always .).

Value Adjust Format (from computer)

- Format : [HEAD][SET ID][COMMAND][VALUE][END]
- Example (Volume level 50%) : [K:][ALL][PON][050[.]
    - [HEAD] indicates the start of the command data (always K:).
    - [SET ID] is the display ID (always ALL).
    - [COMMAND] is the command data (3Bytes).
    - [VALUE] is the parameter setting for the command (000~100).

- [END] indicates the end of the command data (always .).

Status Check Command Format (from computer)

- Format : [HEAD][SET ID][COMMAND][END]
- Example (Power on) : [K:][ALL][PON][?]
  - [HEAD] indicates the start of the command data (always K:).
  - [SET ID] is the display ID (always ALL).
  - [COMMAND] is the command data (3Bytes).
  - [END] indicates the end of the command data (always ?).

Status Check Response Format (from Product)

- Format : [SET ID][:][COMMAND][=][REPLY]
- Example (Source status HDMI1) : [ALL][:][PON][=][005]
  - [SET ID] is the display ID (always ALL).
  - [:] is always ":".
  - [COMMAND]] is the command data (3Bytes).
  - [=] is always "=".
  - [Reply] is the reply data (3Bytes).

OK Acknowledgement

The Product transmits the ACK (acknowledgement) based on this format when receiving normal data. At this time, if the data is data read mode, it indicates present status data. If the data is data write mode, it returns the data of the PC computer.

NOTICE In this mode, display will send the acknowledgement after power on processing completion. There might be a time delay between command and acknowledgement.

- Format : [ALL][:][Command][=][A]

Error Acknowledgement

If there is an error, it returns NG

- Format : [ALL][:][Command][=][N]

Serial Command List

Description	Command	Value	Reply
Power Key Off	POF		
Power Key On	PON		
Power status	PWR		Off : 000, On : 001
Mute Off Execute	MOF		
Mute On Execute	MON		
Mute status	MUT		Off : 000, On : 001
Volume Value	VOL	0 ~ 100	0 ~ 100
Current source status	SRC		VGA : 000, DVI:001, HDMI1:005, HDMI2, 009, DisplayPort: 006
Source change to VGA	SPC		
Source change to DVI	SH1		
Source change to HDMI1	SH2		
Source change to HDMI2	SH4		
Source change to DISPLAYPORT	SH3		

Specifications

LCD Panel

Brightness	Min 220 cd/m2 , Max 260 cd/m2
Contrast Ratio	Min 800:1, Max 1000:1
Viewing Angle	H: 178° / V: 178°
Response Time	5 ms (GTG)
Supported Colors	1.07 billion colors
Display Resolution	3840 x 2160 (16:9)
Display Frame Rate	120 Hz

Signal compatibility / Connectivity

Horizontal / Vertical Frequency	Analog: 31.5 ~ 67.5 KHz / 50 ~ 71 Hz
	Digital: 31.5 ~ 91.1 KHz / 50 ~ 71 Hz
Input Resolution	1920 x 1080 @ 60 Hz (Analog / DVI) / 3840 x 2160 @ 30 Hz (HDMI / DP)
Connectors	DisplayPort / HDMI / DVI / VGA / PC Audio In / IR Extender / Audio Out
Communication Ports	RS232C In

Mechanical

Glass	5mm tempered / Surface treatment is Anti-glare.
Weight	Net: 98 kg / 216 lbs; Gross: 130 kg / 287 lbs
Wall Mount	600mm x 600mm VESA (screw M8 (Depth max 35mm))

OSD functions

Control	Built-in Keypad, IR Remote Controller, RS232C
Language	English, French, German, Italian, Russian, Spanish, Danish, Dutch, Norwegian, Finnish, Swedish, and Korean

Electrical

Power Supply	AC 100V ~ 240V (50/60 Hz), 5-2 Amps, maximum
Power Consumption	Max 500 W
Power Consumption (standby mode)	ECO: 0.5 W, Normal: 2W
Internal Speaker	Input: Max 2Vrms / Output: 10W x 2

Environmental

Operating Temperature	0°C ~ 40°C, 85% RH
Storage Temperature	-20°C ~ 60°C, 90% RH

Touch panel

Touch	4-point Touch
Available touch points	Max 10 touch points simultaneous / 2 drawing points (Over 90% area)
Minimum space touch to touch	60mm
Input Method	finger, gloved hand, or unsharp pointer
Available Object (minimum size for touch)	12mm
Touch Accuracy	Max 5mm
Interface	USB 2.0 Full Speed
Specifications are subject to change without notice.	

Supported Timings

Signal Types	Supported Video Timings	Notes
PC	720 x 400 @ 70Hz	
	640 x 480 @ 60Hz	
	800 x 600 @ 60Hz	
	1024 x 768 @ 60/70Hz	
	1280 x 768 @ 60Hz	
	1360 x 768 @ 60Hz	
	1280 x 1024 @ 60/70/75Hz	
	1920 x 1080 @ 60Hz	
	3840 x 2160 @ 30Hz	Only HDMI / DP
VIDEO	1920 x 1080p 50/60Hz 16:9	4:4:4 and 4:2:2 Supported
	1920 x 1080i 50/60Hz 16:9	4:4:4 and 4:2:2 Supported
	1280 x 720p 50/60Hz 16:9	4:4:4 and 4:2:2 Supported
	720 x 480p 60Hz 16:9	4:4:4 and 4:2:2 Supported
	720 x 576p 50Hz 16:9	4:4:4 and 4:2:2 Supported
	3840 x 2160p 30Hz 16:9	Only HDMI / DP ,4:2:0 Supported

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